RPRSG Summary

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Creation of RPRSG

- RPRSG was created based on interest generated at a tutorial at the March 2000 IEEE 802 Plenary Meeting
- Cisco's Spatial Reuse Protocol was presented as an example of a new ring protocol that solved a particular problem "better" than SONET or Ethernet
  - Sprint, Sun Microsystems, Connexant and Pentacom presented in support

RPRSG Goals & Status

- Creation of a Project Authorization Request (PAR) and 5 Criteria document
- Gain Approval of IEEE 802 Working Groups & Executive Committee members for creation of a new Working Group
- Result was unanimous approval by SEC for creation of 802.17 Resilient Packet Ring WG
  - lots of hard work by many people to achieve this goal

5 Criteria

- Broad Market Potential
  - many companies working in this area
    - we could all be wrong :)
  - RHK views MAN market growing to $13B by 2004
- Compatibility with 802 Architecture (802.1D/f/Q)
  - RPRSG members researched requirements and determined no impediments exist
  - Jumbo frame support a minefield that we will have to make decisions on and navigate

5 Criteria (cont)

- Distinct Identity
  - Objections from some members of 802.1 and 802.3
    - could the same job be done with Ethernet Switches and simple extensions to existing protocols
    - we discussed the issue with 802.1 and provided 802.3 with a response to why the statement above was untrue
  - Concern from 802.3 about confusion in the marketplace caused by re-use of Ethernet PHYs
    - incomplete explanation of RPR use of Ethernet PHY versus RPR is a variant of Ethernet (it is not!)
  - Ethernet in the MAN is a competing technology
  - SONET in the MAN is a competing technology

5 Criteria (cont)

- Technical Feasibility
- Economic Feasibility
  - solutions shipping today
  - many companies hard at work on new systems

What is an RPR

- The following slides are my take on what kind of consensus was achieved during the 4 RPRSG meetings
  - I may have some of it WRONG
  - I left out stuff that is/was controversial so it is not intended to be complete or exhaustive
  - this is a level set
- These slides are not binding on the RPRWG
  - but … the end result of our work must fit into our approved PAR and 5 Criteria

Why are RPRs needed

- SONET does not cut it
  - good resiliency features but
  - static bandwidth allocations are inefficient for data packet transfer
  - higher cost solution
    - dedicated protection bandwidth is wasteful
    - extra equipment to purchase
    - provisioning of service (OAM) is “slow”

Why are RPRs needed

- Ethernet does not cut it
  - spanning tree does not allow a ring topology
    - since the majority of fiber in metropolitan areas are in rings some packets must take the long path
    - spanning tree reconvergence is slow
      - rapid reconvergent spanning tree may improve situation
  - no bandwidth allocation for nodes on the ring
    - performance of the ring is dependant on design of the switch

RPR Features

- Dual Counter Rotating Rings
  - no reserved protection BW
  - both rings carry traffic all of the time
- Media Independence
  - scalable in bit-rate, # nodes, span distance
    - no agreement on the range of values
  - OC-48c & OC-192c SONET/SDH
  - 1Gb/s & 10 Gb/s Ethernet
- Plug and Play
  - easy to install and maintain

RPR Features

- Destination Stripping of variable length uni-cast packets
  - spatial re-use increases BW efficiency of ring
- Variable length broadcast and multi-cast packets
  - MAC layer provides replication function for drop and continue operation
- Mechanism to insure packets do not circulate forever in the event of node loss
- Topology Discovery Mechanism

RPR Features

- Distributed Bandwidth Management & Congestion Control
  - many proposals for mechanisms
- Protection Mechanism
  - achieve sub 50 ms. Protection
  - proposals for both wrapping versus “steering”
- Class Of Service capability
  - multiple priorities for traffic on the ring and queued for transmission
- Support of large MTU (9216 Bytes) is being investigated

Bridging vs. Routing

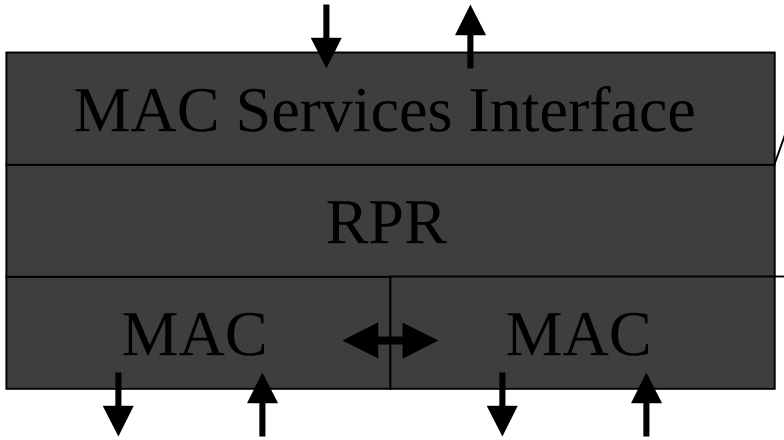
- IEEE 802 requires that any 802 standard implement 802.1D bridging and & 802.1Q VLANs
- Members of RPRSG expect to see both bridging and routing used in networks deploying the 802.17 standard
- A working relationship with IETF IPoPTR will provide input to the WG to insure that requirements for routed systems will be taken into account

RPR MAC Model

SndPkt(pkt,COS,direction)

RcvPkt(pkt,COS,direction)

ProtectionState(cmd,state)



SndPkt(pkt)
RcvPkt(pkt)
LinkState(state)

SndPkt(pkt)
RcvPkt(pkt)
LinkState(state)

Determine packet direction
(addr, protection state)
Queue packet based on COS
Fairness Algorithm
Protection Mechanism
Topology Discovery

CRC Gen/Chk
Address Recognition /pkt fwd